

THE NORTH CAROLINA
COLLEGE OF AGRICULTURE AND MECHANIC ARTS
AGRICULTURAL EXPERIMENT STATION DEPARTMENT

GEO. T. WINSTON, A.M., LL.D., DIRECTOR

Corn Culture in North Carolina

- 1st. Kinds of Land Suited for Corn Culture.
- 2d. Preparation of the Soil.
- 3d. Planting, When and How.
- 4th. Fertilizers to be Used on Corn.
- 5th. How to Cultivate, and Why.
- 6th. A Good Rotation for Corn.
- 7th. Varieties Best Adapted to the South.
- 8th. Harvesting the Crop.
- 9th. Selection and Improvement of Seeds.
- 10th. Protection Against Weevils and Moths.
- 11th. Comparative Food Value of Corn and Other Crops.

B. IRBY, AGRICULTURIST.



WEST RALEIGH, N. C.

THE NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS

AGRICULTURAL EXPERIMENT STATION DEPARTMENT,

WEST RALEIGH, N. C.

BOARD OF TRUSTEES.

W. S. PRIMROSE, Raleigh, *President of the Board.*

A. LEAZAR, Mooresville.	J. Z. WALLER, Burlington.
H. E. FRIES, Salem.	W. H. RAGAN, High Point.
D. A. TOMPKINS, Charlotte.	DAVID CLARK, Charlotte.
T. B. TWITTY, Rutherfordton.	R. L. SMITH, Norwood.
FRANK WOOD, Edenton.	P. J. SINCLAIR, Marion.
J. C. L. HARRIS, Raleigh.	J. B. STOKES, Windsor.
L. C. EDWARDS, Oxford.	W. J. PEELE, Raleigh.
JNO. W. HARDEN, JR., Raleigh.	E. Y. WEBB, Shelby.
H. E. BONITZ, Wilmington.	W. C. FIELDS, Sparta.
MATT MOORE, Warsaw.	J. FRANK RAY, Franklin.

GEO. T. WINSTON, President of the College.

EXPERIMENT STATION STAFF.

GEO. T. WINSTON, LL.D., President of the College and Director.
W. A. WITHERS, A.M., Chemist.
B. IRBY, M.S., Agriculturist.
W. F. MASSEY, C.E., Horticulturist.
G. S. FRAPS, Ph.D., Assistant Chemist.
J. A. BIZZELL, M.S., Assistant Chemist.
ALEX. RHODES, Assistant Horticulturist.
C. W. HYAMS, Assistant Botanist and Entomologist.
J. M. JOHNSON, M.S., Assistant in Animal Industry.
B. S. SKINNER, Farm Superintendent.
J. M. FIX, Bursar.
A. F. BOWEN, Secretary.
MRS. L. V. DARBY, Stenographer.

The Director's office is in the main building of the College. Telephone No. 38.
The street cars pass within one hundred yards of the College building.

The Station is glad to receive any inquiries on agricultural subjects. *Address all communications to the Agricultural Experiment Station, and not to individuals.* They will be referred to the members of the Station staff most competent to answer them.

Corn Culture in North Carolina.

BY B. IRBY, Agriculturist.

KINDS OF LAND SUITED FOR CORN CULTURE.

Corn grows well on most any of our soils, but it reaches perfection on our black soils, on the lime, clay, clay loam and sandy loam. The rich alluvial bottom lands, which are composed of a general mixture of the different soils, would of course give the best possible yield.

The corn crop is a very heavy feeder, as indicated by the large number of surface roots. Hence the crop needs an abundance of rain. It draws heavily on the soil not only for plant food but moisture. In selecting a soil for a large yield this important point must not be overlooked.

Compared with others, this crop evaporates far beyond the average amount, and this large demand must be supplied. By careful experiments and estimates, it has been found that the evaporation is as follows, for this and two other crops:

Corn producing 50 bushels per acre requires 1,500,000 pounds of water.

Potatoes producing 200 bushels per acre require 1,268,000 pounds of water.

Oats producing 29 bushels per acre requires 1,192,000 pounds of water.

There are other crops that exceed the corn crop in evaporation of water, but the above amount is enormous. Taking this into consideration, the texture of the soil, and its power of holding moisture is of vast importance in selecting a soil for growing this valuable crop. A peaty soil, or one very rich in organic matter, when well drained, will make a very fine crop, not because it is so rich in plant food, but because there is usually no lack of water during the growing season.

The retentive power of different soils is illustrated by the following table.

Professor Schubler, of Tübingen, found that by taking 100 pounds of the different soils, and dropping water on them until the water began to drip from them, that:

The sand held	25 pounds of water.
The loam soil held	40 pounds of water.
The clay loam held	50 pounds of water.
The pure clay held	70 pounds of water.

From the above table it will readily appear which is the best soil for corn according to the amount of water supplied.

Of course the texture and fertility would also come into the consideration. But we see at a glance that it is best to select one that is naturally very deep, and rich in plant food, thus affording an extensive area in which the roots may feed.

The soil if deep, will not only furnish an abundance of plant food, but it will act as a reservoir for water, giving it off as capillary water between the rains, thus supplying the roots which naturally grow near the surface.

The texture or condition of the soil is ideal when the average rain in sinking down, as free, or drainage water, is absorbed by the porous soil, and then becomes capillary water and hygroscopic water, reserved for future use.

If the soil is shallow it will be impossible for it to hold much water, hence a heavy rain will run off on the surface, doing great damage. Thus it is that we may always expect best results from our rich bottom lands that are well drained.

This crop, though requiring such abundance of water for its growth, is easily "drowned out," and suffers severely when it stands in water. Hence the proper drainage of the soil is of prime importance. A soil may be very rich in plant food, and one year with a favorable season make fifty or seventy-five bushels of corn, the next year it may be "drowned out" and make absolutely nothing. If this land was properly drained it would not only make a good crop every year, but average a better crop than was made in the good years before the drainage was employed. Corn will turn yellow and soon die if the land is too wet; so, too much stress can not be laid on thorough drainage.

Lands that are too wet at one season will suffer from drought, and lands that usually suffer from drought need drainage, though the statement may seem paradoxical. Hence to drain a soil will enable it to store up water. The reason is obvious, as the water is all compelled to pass down through the soil and the surplus simply passes off in the drains, while the bulk of the rain remains caught up in the soil.

When well drained, the soil becomes more porous and open, or sponge like, and its capacity for holding moisture is thus increased. The free water passing down through the soil opens up innumerable

channels, and these will hold moisture, as capillary water, as soon as the extra pressure is off.

PREPARATION OF THE SOIL.

The best farmers do a great part of their work before the planting is done. This preparation varies, however, with the soil.

For example, heavy clay soils should be plowed deep in the winter, or in the fall, but sandy loams should be plowed deep only in the winter and early spring would be better. The clay soils need the disintegrating effect of the freezes and thaws. They have a tendency to become too compact, whereas the sandy soil is much more open and porous and becomes too loose. Hence very light sandy soils are not much benefitted by this early plowing and freezing. The lime soils are greatly benefitted by deep plowing and by the action of winter weather. In a general way it can be said that the clay and lime soils are heavy, and should be treated very much alike. Heavy soils should never be plowed when wet, as they bake, and the bad effect does not disappear for years.

If the soil has not been plowed deep previously, then it would be best to deepen the soil gradually, say by going one inch deeper each year until the desired depth is reached. Many make shipwreck of a good thing by plowing too deep the first year; it is not always best to completely upset the soil. Plows are constructed to turn the soil but half over, thus leaving the land or strips edged up, affording free access for the air and catching all the water that may fall on the land. It can be readily seen that this would be the ideal condition where the clods, or flakes freeze, as they get soaked with water and the freezing bursts them to pieces, and when they thaw they are as mellow as an ash bank. Where the soil is shallow and the subsoil a stiff clay, it would be best to use a subsoil plow, following the turn plow. The idea is of course to loosen the subsoil, without bringing it to the surface. This deepens the seed bed, and also increases the storage room for water, and allows the roots to feed deeper.

The light soils are benefitted by an occasional deep plowing, but generally speaking they are too loose already, and should rather be made more compact. Hence on the light soils it is better to break just before planting. In this way one plowing can be saved and a better stand of corn obtained. The texture of these light or sandy soils can be improved by plowing to the same depth year after year, and using a heavy roller to compact them, thus increasing their moisture holding capacity.

PLANTING, WHEN AND HOW.

There are three methods of planting. On the ridge, on the level, and in the furrow. The soil, time of year, and weather, will determine which is the best. In some sections it would be well to plant very early, or very late to escape the ravages of the bud worm that infest the corn in May and June.

Very early in the season, when extra early corn is needed, as for roasting ears, the bedding system would be advisable, and the corn should be planted shallow. If the land is wet and cold, then the bedding system is the only safe way to plant.

If the land is well drained, and the soil deep, and the season has fully opened for planting, then the level system should be used, and seeds planted about two inches deep.

Late in the season, especially in sandy soils, it is best to use the furrow system and plant deep, so an abundance of moisture is insured, and the germination is much more certain.

If the soil is stiff clay, break in the fall or winter, and then in the spring run over this land that has been freezing and thawing for the last two or three months, with a spring-toothed harrow, or cutaway-harrow, and if it is not smooth and level, the smoothing harrow should be used. This leaves the land in perfect condition for the corn planter, which should always be used. If the farm is large and has enough land to justify, a two-horse planter can be used; but ordinarily, a one-horse planter will answer. It is best to use one that drops the seed immediately under the opener and has a heavy wheel from four to six inches wide to follow, which not only covers the corn, but packs the soil around the seed, causing it to germinate more perfectly. On large level tracts a two-horse planter and check rower can be used to advantage as it saves hand labor. The advantages of the planter are as follows:

1. The planter will do better work than can be done by hand, and will save seed.

2. Corn will come up quicker and more uniformly as to time, when a planter is used.

3. It will be easier to work, or cultivate, and the use of two men and one horse will be done away with, that was necessary when planted by hand. It will pay to buy a planter if the farmer has but ten acres in corn.

4. It is not necessary to lay off the rows if a planter is used, as any good plowman can be guided by the last row planted.

The distance between the rows, and the distance between the hills on the rows will be governed by the fertility of the soil and by the variety of corn planted.

In thin land the rows should be far apart and only one or two stalks to the hill, and these hills at least three feet apart.

With rich land the rows should be four feet apart to give plenty of air, and for convenience of working; but the corn should be thick on the row, say two stalks in the hill, and not over two feet apart from hill to hill. If for ensilage or stover, then it might be planted still thicker in the row.

If the corn is planted as above directed, it is easily possible to make seventy-five to one hundred bushels per acre. Of course, after all, each farmer must use his own judgment in these little practical questions that come up. Many make the mistake of planting too far apart, and the land does not produce as much as it could. Others of course leave it too thick and find it "burned up," and poorly eared at the end of the season.

If the rows are four feet apart and one stalk in the drill four feet apart, then it is impossible to have more than 2,756 stalks, and if each stalk average one ear, the yield will be about twenty-seven bushels per acre. Possibly this amount would be the capacity of the soil, but it is often the case that it might support many more stalks and of course make a much larger yield.

In using a planter about one gallon of seed corn will be necessary for one acre. This gives plenty and to spare for ravages of birds and insects. The idea should be to put in more than enough, as it is far better to thin out than it is to replant, certainly less trouble, and the replants never amount to very much any way.

If properly managed, the corn does not need any hoe work, but it is of course best for the extra stalks to be cut out, and the skips to be replanted.

FERTILIZERS TO BE USED ON CORN.

Just what fertilizers to use, and which will be most economical, is a perplexing question to farmers each recurring year.

We have to apply potash, nitrogen and phosphoric acid, if they are not already in the soil in sufficient quantities, which is indeed seldom the case.

The nitrogen usually costs about three times as much as either of the other ingredients, but fortunately the nitrogen-gathering plants may be depended upon to store up in the soil this valuable element for the succeeding crop.

By adopting a rotation in which clover, peas, soja beans, or similar plants, take a prominent place the fertility of the soil may be gradually increased, and at the same time much valuable food will be made for the farm animals.

Thus he may reduce his fertilizer bill to a minimum, for he then has nothing to buy but phosphoric acid and potash.

Many times this leguminous crop has not been planted, and the complete fertilizer has to be supplied. The farmer can either buy this ready mixed, or buy his own ingredients and do the mixing. Under good fertilizer laws he is now certain of getting what he has represented to him, and if he does not, then he can recover damages.

If he deals with responsible agents there need be no doubt in his mind as to what he is getting. But he can be sure of one thing, and that is, that he will pay more for the same amount of available elements in the complete fertilizer from the factories than when he buys the ingredients, and does his own mixing. In other words the factories will not mix, sack, and brand fertilizers for nothing. They must be paid as middle men, as well as for the expenses incurred. For example, the farmer in many parts of the South can now buy cotton-seed meal, tankage, nitrate of soda, refuse from the gas factories for his nitrogen, bones and acid phosphate for his phosphorus. And he can buy kainit, muriate of potash, ashes, etc., to supply the potash needed. The only question now is just how to mix them, and how much per acre to give the same result that the ready-mixed gives.

If the fertilizer bulletins are examined it will be found that the different brands average about 2 1-2 per cent ammonia, 8 per cent phosphoric acid, and 2 to 3 per cent potash. Of course when a fertilizer is mixed some formula should be adopted, and the ingredients so mixed that they will produce the desired per cent of the three valuable elements.

To make a fertilizer equal to or better than the above formula he can use the following:

	Ammonia.	Phos. Acid.	Potash.
Cotton-seed meal containing.....	8.5 per cent.	2.5 per cent.	1.8 per cent.
Acid Phosphate containing.....		14. per cent.	
Sulphate of Potash containing..			50 per cent.

Tabulating these and making up a mixture he has:

		Ammonia.	Available Phos. Acid.	Potash.
Cotton seed meal.....	900 lbs.	76.5 lbs.	22.5 lbs.	16.2 lbs.
Acid Phosphate.....	1,000 lbs.		140.0 lbs.	
Sulphate of Potash.....	100 lbs.			50. lbs.
	2,000 lbs.	76.5 lbs.	162.5 lbs.	66.2 lbs.
Per cent contained.....		3.8	81.1	3.3

This will be a better fertilizer than the average ready-mixed, because it has a higher per cent of all the ingredients, and as a gen-

eral thing will cost from two to five dollars less, the mixing and resacking will not cost over 25 cents per ton.

Spread the phosphoric acid on the barn floor, say six inches deep, then put on the meal, then the potash. Start on the edge, and cut through the pile with a hoe, pull it out slightly each time. When the center is reached, then take a shovel and throw it back to the center, being careful to let it fall each time on the top of the pile, and roll down on all sides. Repeat this operation four or five times, and the pile will be found to be well mixed. This can be discerned by the blending of the colors of the fertilizers. Now set a small screen up and open the sack under it on the scales. Throw the fertilizer in the screen, and as it goes in the sack it is cleaned of lumps, strings and trash and is weighed. Write the weight on each sack and it will save re-weighing when carried to the field. This fertilizer can be stored away in the barn, and will be in good condition six months from the day it was put there. This is not so with the ready-mixed fertilizers. They get hard and caked, and have to be mashed up before using. Then again, you can vary the fertilizer mixture to suit the crop and the land. If one piece of corn is on land that was in clover the year previous, not so much nitrogen is required. If the land has been in an exhaustive crop for two or three years, more nitrogen will be needed. If a farmer once gets into the habit of mixing his own fertilizers he will continue to do so unless the relative prices change wonderfully.

Within the last few years the factory mixed fertilizers have gone down in price, while at the same time the market price of the different ingredients have increased. This indicates that the home mixtures are becoming more popular with the users of commercial fertilizers. It is best to apply the fertilizer at two different periods, say two-thirds in the drill just before planting, and one-third in the middle just as the last plowing is done.

Now that the fertilizer is applied, and the corn planted, the next thing is the cultivation.

HOW TO CULTIVATE, AND WHY.

If the land is inclined to be crusty, or to bake, it would be well to run over the crop with a smoothing harrow just before the corn comes up. Run the smoothing harrow right across the rows as if it were the intention to tear the corn out of the ground; remarkably few hills will be disturbed, however. A few days after this harrowing, run around the corn with a five-hoe single-horse cultivator, going as close to the corn as possible without disturbing the roots, or covering up the corn. The plant by this time is about six inches high, and

now it is ready for the hoe hand. He can cut out the surplus stalks, and when necessary replant, and uncover some that the plowman overlooked.

If in stiff land plow next with a double shovel, running five or six inches deep and about six inches from the corn. Let this be the last deep plowing. After this, use the single-horse cultivator, with three-inch hoes instead of inch and a half. Run only about two inches deep, or less, from now on; as the object is to break the crust and furnish a "dust blanket" or earth mulch to hold the moisture in the soil by retarding evaporation. This cultivation will destroy weeds and grass and aid chemical action, as well as retain moisture.

It is much easier to kill the fine weeds and grass as they germinate, rather than let them grow and depend on wrapping them up. These plowings with the cultivator should take place once a week, unless too wet to do good work.

Avoid running too deep, as the roots will be seriously injured, and root pruning is not good for corn.

Cultivate as long as the horse can get about in the crop conveniently, even up to the time of tasseling if necessary. If the crop is planted on a level, it should be cultivated on a level, as it will resist drouth very much better.

Except where lands are wet and subject to overflow it is best to plant on a level. This system will also help in the use of a corn harvester if the crop is to be cut for ensilage or stover.

If the land is cold and wet the corn must then be on ridges or beds, and must be cultivated that way.

On ordinary soils, with level cultivation the moisture will be retained in dry weather much better, and the roots will not be so much damaged by cultivation.

If ridges are to be used let the land be in beds eight to twelve feet wide, and the corn planted in rows four feet apart on these beds or lands.

A GOOD ROTATION FOR CORN.

It is far better for the crop and much more economical if the corn is grown in a rotation. Where clover can be grown, a five-year rotation can be made that will give the land the opportunity to recuperate and build up in the best way possible. This can be altered if clover does not thrive in any particular section, and something else put in the place.

A Good Five-Year Rotation 100-Acre Farm.

1900 Corn and peas.	1900 Second year clover.	1900 First year clover.
1901 Cotton.	1901 Corn and peas.	1901 Second year clover.
1902 Oats or wheat and peas to follow.	1902 Cotton.	1902 Corn and peas.
1903 First year clover.	1903 Oats or wheat and peas to follow.	1903 Cotton.
1904 Second year clover.	1904 First year clover.	1904 Oats or wheat, fol- lowed by peas.

1900 Cotton.	1900 Oats or wheat followed by peas.
1901 Oats or wheat followed by peas.	1901 First year clover.
1902 First year clover.	1902 Second year clover.
1903 Second year clover.	1903 Corn and peas.
1904 Corn and peas.	1904 Cotton.

In the above diagram it will be seen that clover is recommended for two years, this is the biennial or red clover, it could be replaced with crimson, or German clover, and the rotation shortened up two years, besides requiring but three fields instead of five. If the crimson clover is substituted for red clover, then the clover should be sowed in September in the cotton, and the corn and peas should come next as the corn should follow the clover, the corn could be followed by oats or wheat, and if they are followed by the peas, six different crops will have grown on the land in three years, three renovating crops, two exhaustive, and one that is hardly an exhaustive, but a clean culture crop. It would run thus: Cotton from April to September, then clover in the cotton, clover until next May, then corn and peas, then in October put in wheat or oats, next June peas. Next spring the rotation would start over again.

Hairy vetch would be a fine substitute for the clover as it grows in the winter and there is very little doubt about getting a stand. If allowed to mature it will reseed itself. It is an annual and can be easily gotten rid of if desired. It is quite equal to the crimson clover as a nitrogen gatherer.

Peas can be sowed broadcast in the row, or drilled when the corn is laid by; the latter method is better. These peas will furnish all the seed needed for the next year and the vines will renovate the land.

If none of the clovers do well, then arrange the rotation thus: corn and peas first year; oats or wheat, second year, followed by peas broadcast; cotton or tobacco third year, and corn again fourth year, etc. All these rotations insure an abundance of organic matter in the soil, with just such diversity of the staple crops as the Southern farmer would usually grow. If this rotation is analyzed it will be seen that there are several features which should commend it to the progressive farmer.

Corn is found to grow best on a clover sod and will allow grazing of clover field up to time of preparation for corn, unless bud worms are liable to attack the corn, in that case the sod should be turned earlier.

Corn and peas can be followed by cotton very well, as the peas have restored and renovated the land. Corn is an exhaustive crop, but its bad effects on the land have been counter-balanced by the peas.

The cotton is considered an exhaustive crop, but it is not an exhaustive crop in itself, but being a clean cultured crop it brings about a condition of affairs that causes the land to become wasted by washing, as the land is kept clean, and the organic matter is necessarily burned out. Thus we have the clean cultured crop in between two grain crops.

The oats come next, and can be sowed in the spring if the cotton comes off too late. This crop should be followed by peas sowed broadcast. The next two years the land is shaded and prevented from washing, besides being renovated by the clover crop. The cost will be nothing for cultivation, and the crop is easily harvested, making handsome returns in tons of hay, to be used primarily as feed, but later for manure. The farmer may be sure that he will haul the bulk of his clover back in the form of manure.

The question naturally arises, how these fields will be manured. The oat crop sowed in the fall should have all that has accumulated, applied broadcast and turned under, or worked in with a cutaway harrow.

The cotton crop should have what accumulates between fall and spring in addition to some commercial fertilizer put in the drill.

The corn should also have a commercial fertilizer especially rich in phosphoric acid and potash, as it already has an abundance of nitrogenous matter in the clover sod of two years standing.

This potash and phosphoric acid should be about one to three, say 100 pounds potash to 300 pounds phosphoric acid, each containing 12 1-2 per cent available material.

What the crop needs at first is something to give rapid growth, then it can soon take hold of the coarser plant food stored in the soil, and get ahead of the weeds and grass.

By this rotation the corn can be grown at a low cost and only two fields will have to be commercially fertilized each year. Two will be manured, and four will be renovated, two with peas and two with clover.

Four fields are growing a crop that will find a home market, and only one a sale crop.

The four, oats, corn, peas and clover will be run through animals

at home, making refined products, and sold as meat, milk, butter, wool, etc.

The fertilizer bill will be only two-fifths of the usual amount. The farmer will keep a few hands and teams busy all the year, and not be rushed to death at one time and have nothing to do at another. The land will be renovated two years out of five and a great part of the time his stock can be pastured on some of the land.

It is not unreasonable to say that after the first five years he will make more cotton and corn with this rotation on 2-5 of the land, in addition to the other crops, than if he would devote the whole land to corn and cotton, year after year, according to the old method. It would not be unreasonable to claim that, with the renovation and extra manure, that the corn will make four times as much as is ordinarily made per acre.

The labor question is decidedly the most important that will have to be dealt with, and this rotation disposes of that matter pretty well. It is better to have four regular men well paid for the whole year, and hire a few through the year as needed, rather than a larger number of indifferent hands poorly paid, for only a few months, as is usually the case where just cotton and corn are grown.

VARIETIES BEST ADAPTED TO THE SOUTH.

Generally speaking the Dent varieties are the best for the South, but other varieties give good results.

Corn is now grown in the State for ensilage and stover, as well as for grain. Hence the need for a broader difference in the varieties is apparent. The corn can be grouped as follows:

For grain and stover the varieties best suited are:

The 100-Day Bristol, yellow.

Delaware County Dent, yellow.

Johnson and Stokes Giant Beauty, yellow.

Leaming, yellow.

Golden Beauty, yellow.

Chester County Mammoth, yellow.

White Cap Early Dent, yellow.

Early Mastodon, yellow.

Improved Golden Dent, yellow.

Oldham County Yellow, yellow.

Mortgage Lifter, white.

Hickory King, white.

Mammoth White Hite, white.

Riley's Favorite, white.

Cory's Klondike Corn, white.

Snow Flake, white.

Mosby's Prolific, white.

Red Cob, white.

For Grain and Ensilage.

Cock's Prolific, white.

Northern White Field, white.

Blunt's Prolific, white.

White Dent, white.

Red Cob Ensilage, white.

Southern Horse Tooth, white.

Many other varieties could be mentioned, but these are the representative types used in the South, and many of these are known to the farmers by different names.

Some varieties do much better in one locality than in another, as they are better adapted to certain soils and climate. As a general rule it is better to grow corn from seed raised in the same latitude. That grown further North will mature much earlier, and that grown further South will mature much later. Ordinarily, the question of a few days difference in the maturity does not amount to very much, as the seasons are long anyway, and there is plenty of time.

If it is desired to plant in July or August for a late crop, then it would be well to select a very early maturing variety. The late maturing varieties are large yielders. The time varies from three to six months.

As was before stated the Dent is better than the Flint.

If there is no hurry it is better to grow a variety that takes about one hundred and sixty days to mature.

The ears should at least be an average in size, well filled, and when ripe should turn down, as this will insure good keeping during a rainy spell.

The ear should be well covered with the shuck.

The roots should be strong and well able to hold the stalk up in a wind storm.

The cob should be small and the grains broad at outer end to fit well on a small cob.

Use a local variety if practicable.

HARVESTING THE CROP.

Unless the crop is very large and grown exclusively for grain the whole plant should be harvested. In most parts of the South the reverse is the practice, as the blades, or fodder as it is usually called, is pulled by hand and tied in bundles and hung on the stalks to dry. Later, it is stacked, or hauled into the barn. The grain is pulled in the fall when dry, but this fodder pulling is an expensive business,

and is often given out on shares, or "one half for the other" as it is usually called. That is, the farmer will give some one half the fodder pulled for the labor. This proves on the face of it how expensive it is to pull the fodder.

The best method is to cut the corn for stover just after the grain comes out of the doughy state or becomes hard. The harvesting should be done with a harvester if there is any considerable quantity, but if the field is small, then a common weeding hoe, with helve cut to a length of two feet, is the best implement to use. It is much cheaper and better than all the cane knives or special knives made.

Allow the corn to lie on the ground one or two days, if there is no danger of rain. After the dew is off on the first or second day put it up in shocks of about 200 stalks, using a rack or "horse" to start the shock on, consisting of a pole with two holes in one end, into which six foot sticks are thrust for legs.

After shock is built in the shape of wigwam, or cone, then pull the top in with rope and small pulley and tie with tarred twine, being careful to tie in a *bow* knot. Be sure that all the stalks are straight, as they will shed the water much better. So far so good, but right here is where many fail; when the corn shrinks, the string will become loose and thereby allows the shock to bend over, and the rain easily enters the crown, and right here is where the damage is done; for the water falling on the sides will run off, but when it falls on the crown it runs down into the heart of the shock, and rots the inner stalks. To prevent this, take one string and the rope and pulley and go round, ten days or two weeks after the shocking, and draw the heads in tight again, and tie with the extra string; then pull the bow knot of the string with which it was tied before, and take this string and pass on to the next shock, and so on until all is re-tied.

After standing in the shock about two months the ear will be found to be dry and hard, and the stalks dry and nicely cured. Haul to the barn and husk, or shuck out the corn, leaving the shuck on the stalk. Put the ears at once into the bin or crib, as there will be no trouble about heating.

Cut up the shucks, fodder and stalk, with a cutter, or a shredder, and pack away for winter. It is usually more convenient to have the cutter under a shed near the barn and run an elevator to the top of the barn.

The stover is found to constitute nearly half the value of the plant.

Of course it may be more economical in many instances to leave the corn standing, and slip-shuck the corn, then turn the cattle on the stalks and shucks.

When the fields can be grazed and the hay crop is abundant, this plan should be adopted. But if the farmer wants to make so much

feed that he will be compelled "to tear down his barns and build greater," to say nothing of buying extra stock to eat up the food, then let him try this method of curing his corn. He not only has an abundance of reasonably rich food, but all that the cattle refuse to eat will serve for bedding, and will not only keep the animals clean, but will absorb all the liquid manure.

The usual method of getting in the crop is to pull the corn in the fall and haul the ears to the barn, leaving the stalks in the field. Where grain only is needed, this method of course answers; but on the average farm it is willful waste.

If ensilage is required, then the same method for harvesting and cutting up can be used as for the stover; but the cutting should be done when the corn is in the milk state. When allowed to get too old, the ensilage heats badly and does not keep well.

Silos should be as deep as possible in proportion to their width, and they should be air-tight. No cracks nor corners, and the inside plank should be smooth and put on up and down, and not crosswise. The surface should be slick, with no projections, as the silage will settle down better.

The circular silo is the best form, as it economizes in material, and holds more to the amount of material used. Then there are no edges nor corners to contend with. The ensilage should be packed as it runs into the silo, and only the rubbish and trash left should be dumped on top.

No planks, or weight, are needed. They only help the rotting process by preventing the escape of vapors. The first few inches will spoil anyway, and if the trashy part is put on top, then that will rot in time and form an air-tight mass on top. Ensilage properly put up will make an ideal winter food, as it is succulent, and yet a good strong food in a very digestible form. Of course it is best to cut the corn as it goes into the silo. A great deal of hard and unnecessary work can be saved if the cutter and silo are conveniently arranged.

SELECTION AND IMPROVEMENT OF SEED.

There is but little improvement in corn by simply selecting it in the crib. That is better than no care, or selection at all but very little is gained. It is better to begin the selection not only on the stalks, but selection of the stalk itself. In other words, go carefully up and down the rows, cutting out the stalks not producing the required number of ears, or the right kind. The pollen on the faulty stalks will influence the good or perfect ears as much as the pollen from the best stalks.

The silk, or female part of the flower, should be influenced by the pollen from the perfect stalks only. When the ears appear, cut

down the faulty stalks, as they can be easily distinguished by that time, and the bad influence avoided. If the ears are to be selected in the field, then the tassel only need be cut off, and let the one ear come to maturity on these faulty stalks, as it will not be selected for seed anyway.

After the farmer goes carefully over the field and selects the perfect ears from the best stalks, then he should go carefully over these ears and select out the finest individual ears, and thus he is enabled to get the very best types from which to grow.

It is best to do away with end grains, as they are usually more or less damaged, and will cause the planter to drop irregularly.

PROTECTION AGAINST WEEVILS AND MOTHS.

If the corn is to be left in the field for maturity, then the shuck should remain on it when put in the crib, as it helps to protect from the weevils and moths. Especially is this true of the Angoumois grain moth (*Gelechia cerealella*).

The black weevil (*Calandra oryzae*) is more apt to come on the second year, or the following spring after the corn has been housed.

The corn should be well dried or cured before it is stored away and there will be no danger from heating. It should be put in a close rat or mouse-proof bin, closed on top as well as the sides, as the mouse is very ingenious in making an entrance. The close crib can be used very effectively to kill the weevils and moth as the bisulphide of carbon can be applied so easily. It can be sprinkled on top of the corn when the hauling is finished, or along while the hauling is going on, being careful to keep the door closed that the fumes may reach every part of the heap.

The fumes will disappear in a week or ten days, and there is no danger except from fire, as the bisulphide is very combustible.

No fire should be allowed around the crib, not even a pipe, as an explosion may occur.

About one pound of the bisulphide should be used to every one hundred bushels of corn. If the corn is free, or even comparatively free from weevils, then there is no necessity for bisulphide.

China berries and Jerusalem oak are often mixed in with the corn, but these remedies do not amount to much.

COMPARATIVE FOOD VALUE OF CORN AND OTHER CROPS.

It will be seen from the following table that this food stuff ranks high in feed value, and will always be the leading grain feed of the State.

The table was taken from N. C. Ex. Station Bulletin, No. 163, and is self-explanatory:

TABLE V.—Showing Average Composition of Feeding Stuffs—American Analyses.

Foods.	No. of Analyses.	PERCENTAGE COMPOSITION.						PERCENTAGE OF DIGESTIBLE MATTER.						
		Water.	Dry Matter.	Total Protein.	Fats (Eth. Extract.)	N-Free Extract.	Crude Fiber.	Ash.	Dry Matter.	Protein.	Fats.	N-Free Extract.	Crude Fiber.	Ash.
Cowpea-vine hay	13	11.90	88.10	14.43	2.49	41.22	21.54	4.42	52.15	9.31	1.34	29.14	9.24	3.79
Crimson clover hay	2	10.85	89.15	15.20	1.84	38.91	25.65	6.90	55.45	10.50	.89	28.82	12.49	4.14
Lucerne, or alfalfa hay	3	11.53	88.47	14.89	2.24	34.18	30.26	7.73	52.55	10.85	1.15	23.21	13.95	-----
Red clover hay	35	11.63	88.37	12.50	2.43	40.43	26.81	6.15	45.69	6.17	1.03	23.28	12.73	-----
Alsike clover hay	6	8.91	91.09	13.18	2.56	40.48	27.22	7.63	50.00	7.31	1.36	25.95	12.57	-----
Soy (soja) bean silage	1	74.20	25.80	4.05	2.23	6.95	9.70	2.84	15.22	3.07	1.60	3.61	5.31	1.61
Soy bean hay	3	12.04	87.96	15.98	4.19	34.39	27.57	5.83	54.89	11.27	1.74	25.93	16.38	1.38
Peanut-vine hay	2	8.34	91.66	10.31	4.52	46.64	23.14	7.05	54.90	6.53	2.98	32.41	12.01	1.44
Corn silage, whole plant	3	71.98	28.02	2.11	.61	16.42	7.72	1.16	14.91	.73	.40	9.93	3.34	0.30
Pulled fodder, blades alone	2	8.94	91.06	11.82	3.31	41.45	24.72	9.72	54.64	5.34	1.96	26.28	17.06	2.56
Corn fodder, whole plant	11	32.19	67.81	4.81	1.28	37.15	20.21	4.32	-----	2.60	.90	23.63	13.84	-----
Corn stover, whole plant, minus ears	10	22.81	77.19	5.47	1.34	39.90	25.55	4.92	47.70	2.80	.69	25.29	17.04	2.18
Corn butts or stubble, portion below ears*	1	46.74	53.26	1.76	1.08	27.37	20.46	2.59	35.42	.37	.86	18.89	15.04	.30
Corn husks or shucks*	1	8.10	91.90	3.33	0.85	51.55	32.81	3.36	66.17	.98	.28	88.65	26.08	.54
Corn tops, cut above ears	2	12.19	87.81	7.96	2.44	42.16	28.03	7.22	50.32	3.08	1.62	24.97	19.87	.54
Sorghum fodder, leaves alone	1	12.43	87.57	9.60	4.55	44.93	23.93	4.56	55.25	5.84	2.12	28.98	16.84	1.34
Sorghum bagasse	2	11.25	88.75	3.44	1.44	50.47	30.52	2.88	53.78	.47	.67	32.72	19.46	.38
Timothy hay	58	10.21	89.79	6.18	2.19	46.91	30.29	4.32	51.90	3.03	1.21	30.16	16.14	1.46
Red top hay (Agrostis vulgaris)	4	9.52	90.48	7.70	2.14	46.19	28.52	5.93	52.12	4.65	.94	27.30	17.45	1.44
Orchard grass hay	6	9.80	90.20	6.82	2.38	42.12	33.23	5.63	51.68	4.08	1.29	23.42	20.40	1.95
Johnson grass hay	3	12.80	87.70	7.55	2.93	41.62	29.69	5.91	47.80	3.37	1.16	22.64	17.16	3.32
Cat tail, or pearl millet	2	10.47	89.53	9.94	1.97	36.62	30.78	10.22	55.78	6.22	.91	21.64	20.47	6.99
Mixed hays	10	15.41	84.59	6.25	2.09	40.30	31.21	4.73	45.93	2.99	1.04	22.93	14.95	-----
Meadow (mixed) hay (horse)	5	me compo	posi	tion as above	-----	-----	-----	-----	40.11	3.60	.37	23.42	12.18	-----
Oat straw	13	8.84	91.16	3.80	2.29	39.12	41.23	4.72	45.85	?	.88	20.81	23.75	-----

Whole raw cotton-seed	1	17.51	82.49	14.48	19.38	25.41	20.30	2.90	54.53	9.83	16.88	12.60	15.32	1.25
Whole-roasted cotton-seed	1	9.32	90.68	16.03	22.48	25.78	24.03	2.26	50.69	7.56	16.11	13.25	15.84	---
Cotton-seed meal	4	7.74	92.26	38.78	10.25	30.20	6.37	6.66	67.63	34.05	9.19	18.57	2.96	2.10
Cotton seed hulls	5	11.50	88.50	4.15	2.92	39.14	39.87	2.38	36.37	.24	2.32	13.42	18.90	.51
Wheat bran	70	12.43	87.57	15.37	3.85	53.44	9.32	5.60	51.92	11.97	2.82	35.16	1.68	---
Corn meal (cows)	63	15.61	84.39	9.12	3.93	67.92	1.99	1.45	71.39	5.32	3.61	59.16	.07	---
Corn meal (pigs)	Same composition as for cows.								75.51	7.85	3.21	63.93	.58	---
Corn (digested by horse)	Same composition as for cows.								78.01	8.09	3.32	64.30	0.84	---
Corn-meal (digested by goats)	Same composition as for cows.								71.39	5.32	3.61	59.16	---	---
Whole corn (pigs)	201	10.52	89.48	10.89	5.44	69.81	2.09	1.55	77.01	8.40	3.62	63.74	91	---
Corn and cob meal (goats)	9	14.52	85.48	8.36	3.51	65.03	7.06	1.52	67.27	5.45	2.97	55.67	3.37	---
Corn and cob meal (pigs)	Same composition as for goats.								61.62	6.33	2.83	54.37	2.01	---
Oats	25	10.94	89.06	11.38	4.81	60.05	9.85	2.97	---	8.76	3.94	44.44	1.67	---
Oats (horse)	Same composition.								59.71	9.05	3.42	45.08	2.87	---
Rice bran, or douse (sheep)	5	9.65	90.35	12.07	8.76	50.04	9.51	9.97	80.63	9.33	7.82	50.04	6.39	---
Cowpea, a bean, ground (horse)	5	14.81	85.19	20.75	1.44	55.72	4.06	3.22	74.16	17.82	0.19	52.13	2.66	---
Cowpea, a bean, ground (ruminants)	Same composition as for horse.								75.72	18.27	1.17	51.09	2.91	---
Cowpea, ground (swine)	Same composition as for horse.								77.45	18.28	.70	53.86	2.77	---
Soy beans (sheep)	8	10.80	89.20	33.98	16.85	28.89	4.79	4.69	75.86	29.64	15.88	17.96	---	---
Rye bran (swine)	12	11.64	88.36	14.74	2.81	63.74	3.48	3.59	59.20	9.72	1.61	47.47	.31	---
Rice (swine)	10	12.44	87.56	7.44	0.19	79.20	0.35	0.38	86.07	6.88	.13	78.88	---	---
Potatoes (swine)	12	78.89	21.71	2.14	0.10	17.36	0.56	0.95	19.62	1.55	---	17.02	.30	---
Buttermilk	1	91.49	8.51	3.19	0.27	4.49	---	0.56	8.05	3.05	.25	4.42	---	---
Carrots (horse)	15	88.59	11.41	1.14	0.42	7.56	1.27	1.02	9.95	1.13	---	7.09	---	---
Cow's milk, composite (calves)	---	85.26	14.74	3.21	5.37	5.44	---	0.72	4.41	3.09	5.36	---	---	---
Crab grass hay	2	10.31	89.69	6.92	1.62	40.96	32.92	7.27	---	2.21	0.577	21.63	3.77	---
Cowpea meal	1	12.63	87.37	23.25	1.59	56.47	3.69	3.37	---	18.25	1.175	52.57	2.36	1.13
Rice bran	1	10.22	89.78	13.50	10.72	46.47	10.86	8.23	---	8.49	9.50	36.65	3.17	0.20
Corn bran	1	10.80	89.20	9.77	5.74	61.96	9.32	2.37	---	5.22	4.15	49.32	4.95	---
Rape (first growth)	1	81.52	18.48	4.02	0.77	8.13	2.29	2.29	---	3.64	0.42	7.63	2.06	1.75
Rape (first growth)	1	85.06	14.94	3.85	0.58	5.87	1.45	2.02	---	3.36	0.25	5.28	1.22	0.99

* Analyses from Bulletin 20, Maryland Experiment Station.

† Compilation of Dr. E. H. Jenkins, Annual Report Connecticut Experiment Station, 1888.

